

REVIEW  
OF THE  
PREVENTIVE MEASURES  
TAKEN AGAINST KAK'KE

IN THE  
IMPERIAL NAVY.

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TŌKYŌ.





## PREFACE.

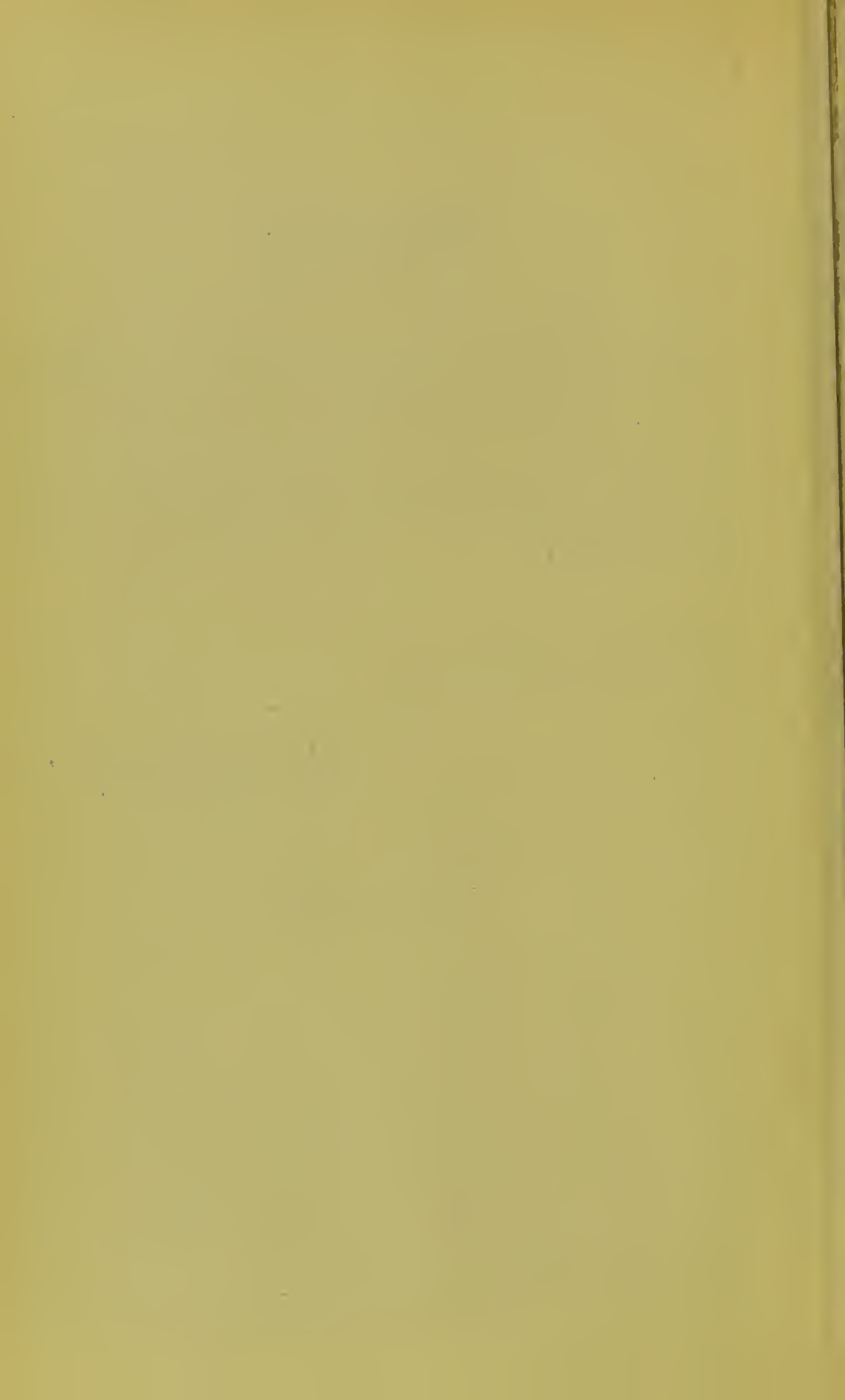
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Our Navy for a long time suffered from *Kak'ke*, which has now been extirpated by an improvement in the scale of diet. The particulars have been compiled and are herewith published by order of Viscount Sukenori Kabayama, Minister of State for the Navy.

*23rd year of Meiji (1890).*

CENTRAL SANITARY BUREAU,  
NAVY DEPARTMENT.



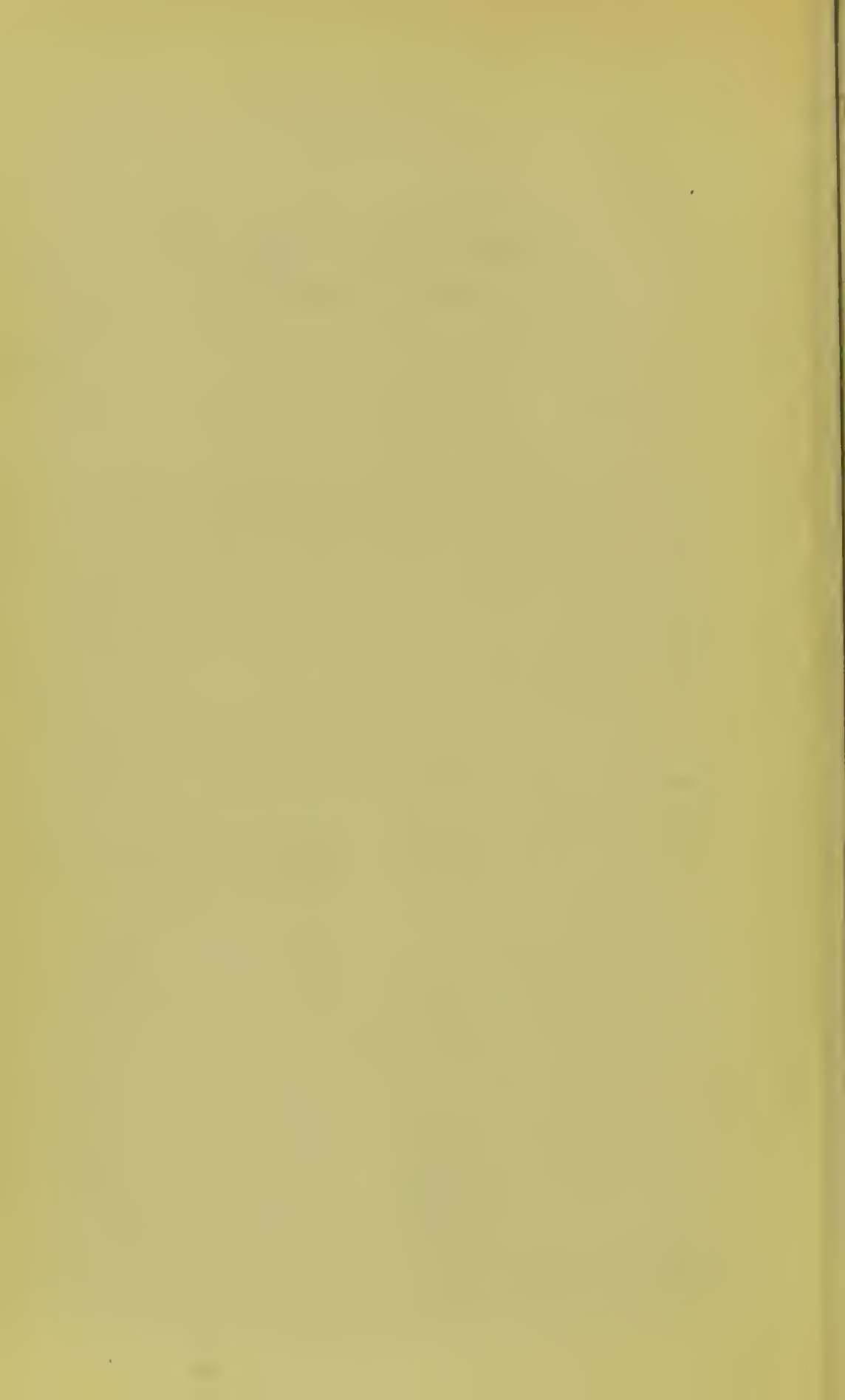


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That the health of our Navy has improved year after year, during the past few years, is an undeniable fact which is made plain in the annual reports of the Navy Department. The most striking result is the extinction of *Kak'ke* which has been considered to have had a great influence upon the progress of the Navy. It is true that, with the progress of society, persons in the Navy came to take care of their health, even where they have not been in connection with medical or sanitary matters, so that their health generally has been much improved. It is also true that such improvement of individual health has its effect upon the general improvement, but the extinction of *Kak'ke* must be attributed to the improvement in the scale of diet which was carried out in 1884.

There is a wonderful difference in the amount of the cases of *Kak'ke* in our Navy before and after the improvement in the scale of diet. Table No.I shows the general condition of the health of the Navy during the space of twelve years, from 1878 to 1889, which is divided into two periods, before and after 1884, this being the year when the improvement in the scale of diet took place. It will be seen from the Table that the number of cases of *Kak'ke* in the first period of six years was 9,516 for the average sum\* of the force of 29,321.

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\* The average sum of the force is the sum of the mean force of every year added together, and the number taken in estimating the force is, in all cases, the number of petty officers and men below them.

In the second period of six years, the number of cases was only 765 for the average sum of the force of 48,275 ; that is, the number of *Kak'ke* cases was about  $\frac{1}{3}$  in the first period, whereas in the second period it had decreased to about  $\frac{1}{63}$  of the total number of the force. Moreover, these 765 cases were not evenly distributed over the period of six years, but 718 cases appeared in 1884, when the improvement in the scale of diet had just commenced, and therefore the effect was not yet satisfactory ; forty one cases appeared in 1885, when the effects of the improvement began to be manifest ; and three cases appeared in 1886, when the effects were very apparent. In the period of four years from 1887 to 1890, there were only three cases, of which two cases occurred after the men had run away from the Navy, when they could hardly obtain even the commonest food, so that the number of cases actually occurring in the Navy was only one.

Before the improvement in the scale of diet took place, there were many cases of *Kak'ke* in every ship which made a long voyage, while there were no cases after the improvement, except in the *Tsukuba*, which sailed just after the improvement had commenced. It is clear, then, that *Kak'ke* in the Navy has been extirpated by the improvement in the scale of diet. Furthermore, this improvement not only swept away this dangerous disease of *Kak'ke*, but it improved the general health of men in the Navy, and, in addition it effected an estimated saving of about *yen* 1,232,417, which sum would otherwise have fallen upon the national treasury. As shown in the Table No.I, during the period of six years preceeding 1883, the number of cases was 107,253 for the average sum of the force 29,321, amongst which, 2,142 cases were either admitted into hospital or suspended from duty, 507 proved fatal, and 213 were invalided. During the period of six years after 1884, when the improvement in the scale of diet commenced, the number of cases was 33,388 for the average sum of the force 48,275, amongst which, 648 cases were either



admitted into hospital or suspended from duty, 329 proved fatal, and 318 were invalided. Comparing the periods before and after the improvement in the scale of diet, it is seen that in the second period of six years, in spite of the increase of 18,954 in the average sum of the force, the number of cases had decreased by 73,865, that of the cases either admitted into hospital or suspended from duty by 1,494, and the number of fatal cases by 178, while only the number of the invalidings had increased, by 105. If the health of the Navy in the second period had been proportionally the same as in the previous period, the number of cases would have been 176,549, that of those admitted into hospital or suspended from duty, 3,531, that of fatal cases, 832, and that of invalided persons, 350, for the average sum of the force of 48,275. If the actual number is subtracted from the estimated number, the remaining number is found to be 143,161 cases, of which 2,883 would be persons admitted into hospital or suspended from duty, and of these, 503 would be fatal cases and 32 would be invalidings. If the expense of treatment of 143,161 cases is calculated according to the standard of the first period, which was *yen* 0.992 for each case, including medicines, surgical and medical appliances, etc., it would amount to *yen* 142,015.712; the burial expenses of 503 persons would be *yen* 6,287.50, the average expenses being *yen* 12.50 per one person, and the expenses of sending home thirty two invalided persons would be *yen* 472.64, the average expenses of one person being *yen* 14.77. There has thus been an estimated decrease in expense of *yen* 148,775.852. Furthermore, the expenses of food, salary and clothing for 2,883 patients either admitted into hospital or suspended from duty, would be *yen* 358,748.988 (the number of petty officers being  $\frac{1}{6}$  of the number of seamen etc.), which if added to the former sum of *yen* 148,775.852 would make a total sum of *yen* 507,524.84. But these 2,883 patients are men necessary for the Navy, so that if they were unfit for active service, new men must be enlisted to make up the deficiency, which would entail an expense of

*yen* 29,723.98 for enlisting, and *yen* 28,066.005 for travelling. Besides, if the number of cases had increased as it was estimated, the number of extra hospital wards required must be added, together with the number of surgeons and sick-berth attendants, which would require about *yen* 108,761. Consequently, the saving effected by the improvement in the scale of diet would be *yen* 674,075.825. Again, if the productive power of one person is supposed to be *yen* 0.10 a day, that of 1,922 admitted patients out of 2,883 patients above mentioned, would be *yen* 70,153 for a year; and as 535 persons who either died or were invalided would be entirely non-productive, the sum of *yen* 488,187.50 would be lost for twenty five years, supposing the productive power of each person to be *yen* 0.10 a day. Both of these two sums may be said to have been saved by the introduction of the improved scale of diet. Now, if all the sums of money mentioned above are added together, they will amount to *yen* 1,232,416.325, a sum which has been saved to the national treasury as the effect of the said improvement.

Previous to 1881, the number of the cases of *Kak'ke* in the Navy was about three-fourths of the whole number of cases. In 1882, when there was trouble with Corea, a great many of the crew of the *Fusō*, *Kongō*, *Hiei*, and *Nisshin*, which were then amongst our strongest men-of-war, were suffering from or died from *Kak'ke*, so that they would have been of no use if war had actually broken out. Furthermore, as is shown in the table at the end of this book, which exhibits the general health of the Navy, the health of the Navy up to 1883 was generally bad, so that one person suffered, on an average, three or four times, or even oftener, in a year, and it was anxiously questioned whether the Navy would be of any use in the time of war. But there was a sudden improvement of health after the improvement in the scale of diet in 1884, so that one person suffered on an average, only 0.34 times in a year; while *Kak'ke* became entirely extinct after two or three years. The Navy is now composed of strong men, worthy to

protect our Empire, a favourable result which has been obtained entirely by the improvement in the scale of diet.

From the end of 1880, when Director General Kanchiro Takaki—then Deputy Inspector-general—was the Director of the Tokyō Naval Hospital, he determined to inquire into the cause of *Kak'ke*. He noticed the great difference between the number of *Kak'ke* cases on board ships and in barracks, and also the same difference in the ships which went on long voyages, and began to think that such difference must be due to the difference between the articles of food given on board ships and in barracks, as other things being the same. Obtaining permission from the Minister of the Navy Department, he made an examination of food by visiting ships and barracks within the limits of the district of Uraga. He obtained a report showing the articles and quantities of food given in each ship or barrack during a week, and found on examination, that the amount of albuminates contained in the food given was not sufficient, and that the amount of carbo-hydrates was too great for the due preservation of health.

He then concluded that the occurrence of a large number of cases of *Kak'ke*, whether in men on long voyages or amongst ordinary students and shop assistants on shore, must be due to the food used, this being the cause of the great number of *Kak'ke* cases occurring in the ships and barracks within the limits of the Uraga district, and he inferred that the cause of *Kak'ke* must be in the improper proportions of carbon and nitrogen contained in the food. On the 17th of February, 1882, when he was appointed Vice Director of the Medical Bureau, in consultation with Director General Bunkai Totsuka, the Director of the Medical Bureau, he issued a form of table for registering the details of *Kak'ke*, and presented a memorial in regard to preventive measures against *Kak'ke*; he also commenced the selection and examination of food. On the 29th of November, 1882, he made a personal statement to His Majesty the Emperor, for the first time, in regard to the cause of and

preventive measures against *Kak'ke*. Subsequently, as a greater number of *Kak'ke* cases had occurred in the *Ryūjō*, which had made a voyage to South America in 1883, a committee for examination was specially appointed, in accordance with his request, and the enquiries of the members were represented by 10,465 questions and answers. The *Tsukuba*, with the improved scale of diet, was ordered to take the same course as the *Ryūjō*, when the examining committee which was specially appointed on board that ship found that the improved diet had a good effect in preventing the occurrence of *Kak'ke*. Deputy Inspectors-general Kagami, Kawamura, Toyozumi, Maeda, Yano, Shimada, and Shiba-oka were from time to time called together to fix the plan of procedure for carrying out the improvement in the scale of diet, and each Deputy Inspector-general was instructed to use his best efforts to improve the food and to give orders to the surgeons under him to carry out the improvements with all their energy. In doing this, many difficulties were met with, but by the united efforts of all persons concerned in the matter, the food was more and more improved, and the object aimed at was attained gradually.

On the 19th of March, 1885, Deputy Inspector-general Kanehiro Takaki, the Director of the Medical Bureau, again obtained an interview with His Majesty the Emperor, when he reported that the improvement in the scale of diet had a good effect in extirpating the source of *Kak'ke*, so that it might sooner or later become extinct in the Navy. Since then, *Kak'ke* has been actually extirpated, as stated above, and the general health of the Navy has been improved at the same time.

There were a great many difficulties in carrying out the improvement in the scale of diet, as it was a sudden breaking up of the old system. Notwithstanding this, Count Sumiyoshi Kawamura, the Minister of the Navy Department, instructed the officers to engage in this difficult work, and, the officers



diligently following the instructions, the favourable result spoken of was finally obtained, in spite of many hindrances. Whereupon, on the 16th of October, 1890, Director General Kanehiro Takaki, the Director of the Central Sanitary Bureau of the Navy Department, presented to His Majesty the table printed at the end of this book, which gives the general health of the Navy, and showed that by the improvement in the scale of diet, *Kak'ke* had been extirpated, in addition to there being an improvement in the general health of the Navy.

TABLE, No.

TABLE SHOWING THE NUMBER OF CASES OF  
BEFORE AND AFTER THE IMPROVE

YEAR.	FORCE.	CASES OF A&E'ke.	AVERAGE DAILY NO. OF HOSPITAL CASES OR SUSPEND- ED FROM DUTY.	DIED.	INVALIDED.	TREATMENT EXPENSES.	PAY AND EX- PENSES OF FOOD & CLOTHING OF PATIENTS AD- MITTED OR SUS- PENDED FROM DUTY.
1878	4,528	1,485	98	32	19	<i>Yen</i> 1,473.120	<i>Yen.</i> 12,194.728
1879	5,081	1,978	131	57	8	1,962.176	16,301.116
1880	4,956	1,725	115	27	9	1,711.200	14,310.140
1881	4,641	1,163	77	30	16	1,153.696	9,581.572
1882	4,769	1,929	128	51	17	1,913.568	15,927.808
1883	5,346	1,236	83	49	4	1,226.112	10,328.188
Total	29,321	9,516	632	246	73	9,439.872	78,643.552
1884	5,638	* 718 † 1,113	47 76	8 39	1 13	712.256 1,104.096	5,848.492 9,457.136
1885	6,918	* 41 † 2,205	2 148	.... 58	1 16	40.672 2,187.360	248.872 18,416.528
1886	8,475	* 3 † 2,749	.... 184	.... 71	.... 21	2.976 2,727.008	.... 22,896.224
1887	9,106	* .... † 2,956	.... 198	.... 76	.... 22	.... 2,932.352	.... 24,638.328
1888	9,184	* .... † 2,982	.... 200	.... 77	.... 23	.... 2,958.144	.... 24,887.200
1889	8,954	* 3 † 2,865	.... 191	1 75	.... 22	2.976 2,842.080	.... 23,767.276
Total	* 48,275 † ..	765 14,870	49 997	9 396	2 117	758.880 14,751.040	6,097.364 124,062.692

\* denotes the actual number. † denotes the estimated number. The estimator obtained by subtracting the actual number from the whole estimated number.

## I.—A.

KAK'KE AND THE AMOUNT OF EXPENSES  
MENT IN THE SCALE OF DIET.

BURIAL EXPENSES.	TRAVELLING EXPENSES OF THE INVALIDED.	TRAVELLING EXPENSES OF THE MEN ENLISTED TO MAKE UP THE DEFICIENCY.	INTEREST ON THE MONEY EXPEND- ED ON INCREAS- ING THE WARDS IN HOSPITAL.	PAY & EXPENSES OF CLOTHING OF ADDITIONAL OF- FICERS IN HOS- PITAL.
<i>yen</i> 400,000	<i>yen</i> 280,630	....	....	....
712,500	118,160	....	....	....
337,500	132,930	....	....	....
375,000	236,320	....	....	....
637,500	251,090	....	....	....
612,500	59,080	....	....	....
3,075,000	1,078,210	....	....	....
		<i>yen</i>		
100,000	14,770	457,545	....	....
487,500	192,010	739,860	....	....
....	14,770	19,470	....	....
725,000	236,320	1,440,780	<i>yen</i> 367,889	<i>yen</i> 887,172
....	....	....	....	....
887,500	310,170	1,791,240	858,533	2,054,223
....	....	....	....	....
950,000	324,940	1,927,530	1,085,049	2,394,693
....	—	....	....	....
962,500	339,710	1,947,000	1,119,851	2,553,622
12,500	....	....	....	....
937,500	324,940	1,859,385	1,221,597	2,465,806
112,500	29,540	477,015	....	....
4,950,000	1,728,090	9,705,795	4,652,919	10,355,516

ed number here mentioned is not the whole estimated number, but the remain-

TABLE, No.

TABLE SHOWING THE NUMBER OF THE CASES  
OF EXPENSES BEFORE AND AFTER THE

YEAR.	FORCE.	GENERAL CASES.	AVERAGE DAILY NO. OF HOSPITAL CASES OR SUSPEND- ED FROM DUTY.	DIED.	INVALIDED.	TREATMENT EXPENSES.	PAY AND EX- PENSES OF FOOD & CLOTHING OF PATIENTS ADMIT- TED OR SUS- PENDED FROM DUTY.
1878	4,528	17,788	355	56	44	<i>Per</i> 17,645,696	<i>Per</i> 44,174,780
1879	5,081	22,426	448	119	39	22,246,592	55,747,328
1880	4,956	22,819	456	63	43	22,636,448	56,742,816
1881	4,641	15,766	315	81	29	15,639,872	39,197,340
1882	4,769	12,074	241	103	30	11,977,408	29,989,076
1883	5,346	16,380	327	85	28	16,248,960	40,690,572
Total	29,321	107,253	2,142	507	213	106,394,976	266,541,912
1884	5,638	* 10,515 † 10,103	200 212	45 52	44 (3)	10,430,880 10,022,176	24,887,200 26,380,432
1885	6,918	* 6,866 † 18,433	135 371	49 70	33 17	6,811,072 18,285,536	16,798,860 46,165,756
1886	8,475	* 4,894 † 26,099	96 524	63 83	52 9	4,854,848 25,890,208	11,945,856 65,204,464
1887	9,106	* 3,954 † 29,346	79 587	55 102	56 10	3,922,368 29,111,232	9,830,444 73,043,932
1888	9,184	* 3,679 † 29,906	74 598	65 93	84 (17)	3,649,568 29,666,752	9,208,264 74,412,728
1889	8,954	* 3,480 † 29,274	64 591	52 103	49 16	3,452,160 29,039,808	7,963,904 73,541,676
Total	* 48,275 † ....	33,388 143,161	648 2,883	329 503	318 32	33,120,896 142,015,712	80,634,528 358,748,988

Note :—The figures in the parenthesis denote the decreased number of cases



## I—B.

OF GENERAL DISEASES AND THE AMOUNT  
IMPROVEMENT IN THE SCALE OF DIET.

BURIAL EXPENSES.	TRAVELING EX- PENSES OF THE INVALIDED.	TRAVELLING EX- PENSES OF MEN ENLISTED TO MAKE UP THE DEFICIENCY.	INTEREST ON THE MONEY EXPEND- ED ON INCREAS- ING THE WARDS IN HOSPITAL.	PAY AND EXPENS- ES OF CLOTHING OF ADDITIONAL OFFICERS IN HOS- PITAL.
<i>Per</i>	<i>Per</i>			
700,000	649,880	....	....	....
1,487,500	576,030	....	....	....
787,500	635,110	....	....	....
1,012,500	428,330	....	....	....
1,287,500	443,100	....	....	....
1,062,500	413,560	....	....	....
6,337,500	3,146,010	....	....	....
		<i>Per</i>		
562,500	649,880	....	....	....
650,000	(44,110)	2,063,820	....	....
		<i>Per</i>	<i>Per</i>	<i>Per</i>
612,500	487,410	....	....	....
875,000	251,090	3,611,685	1,103,668	2,661,516
787,500	768,040	....	....	....
1,037,500	132,930	5,101,140	2,575,599	6,162,669
687,500	827,120	....	....	....
1,275,000	147,700	5,714,445	3,255,148	7,284,079
812,500	1,240,680	....	....	....
1,162,500	(251,090)	5,821,530	3,359,555	7,660,865
650,000	723,730	....	....	....
1,287,500	236,320	5,753,385	3,364,792	7,397,420
4,112,500	4,696,860	....	....	....
6,287,500	472,640	28,066,005	13,658,762	31,166,552

estimated on the basis of the first period.

After the receipt of the reply concerning the supply of the articles of food to the petty officers and men of the Navy, which had been examined into at three Bureaux of Finance, Medicine, and *Shusen*, the following notification was issued to the Navy.

C. No. 7.

It is hereby ordered that the following Regulations in regard to the Supply of Food to the Petty Officers and Men in Ships and Barracks shall be observed from February, 1st, 1884.

(Signed.) Minister of the Navy Department.  
January, 15th, 1884.

Regulations in regard to the Supply of Food to  
the Petty Officers and Men in Ships and Barracks.

Art. I. The food of petty officers and men in ships and barracks shall be under the control of the principal officer under whom they are serving, and the articles of food shall be bought with the money allotted for the purpose, and supplied to them.

Art. II. The articles of food shall be as follows ; rice, bread, beef (fresh or preserved), salted beef, salted pork, fowls or eggs, fish, *miso*, \* *shoyu* (sauce), vegetables (potatoes, carrots, radishes, cabbages, and onions), beans, wheat flour, tea, fats and oils (suet or lard, butter, olive oil, oil of the *sesamum orientalis*), sugar (and starch), milk, vinegar, spices, alcoholic liquors, salt, pickles.

If any of the articles above named can not be obtained, similar articles may be substituted for them.

Art. III. The articles of food shall be bought by the paymaster by order of the officer in command, and they

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\* A kind of sauce made of beans, barley and salt.

shall be given out after being examined by the surgeon.

Art. IV. A record of the articles of food shall be kept by the paymaster, which shall frequently be examined by the officer in command.

Art. V. If the preserved articles of food are found to be in bad condition, the matter shall be reported by the paymaster to the officer in command, who, in turn, shall order the surgeon or other officer to examine them and shall report the matter to the Minister of the Navy Department through the chief of different department.

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In the same month, there was a consultation respecting a long voyage to be taken by the *Tsukuba* for the purpose of training the cadets of the Naval School. Deputy Inspector-general Takaki, the Director of the Medical Bureau, then suggested to the Minister that this would be a good opportunity for a trial of preventive measures against *Kak'ke*, as well as for the training of the cadets, and that the *Tsukuba* might take the course which the *Ryūjō* had taken in 1882-1883. On account of the expense, however, the course of the *Tsukuba* was fixed between Hawaii, Vladivostok and Fusan. On the 18th of the same month, Surgeon Aoki came to Deputy Inspector-general Takaki, and stated that the *Tsukuba* had every thing ready for the trial of the preventive measures against *Kak'ke*, and, in addition, that all the members of the crew are anxious for the carrying out of the proposed scheme. It would be well, consequently, for the sake of comparison, if the course of the ship could be altered to that taken by the *Ryūjō*. The Director thereupon requested, through Rear-admiral Maki, the chairman of the committee for the examination of *Kak'ke*, that the *Tsukuba* should take the same course as the *Ryūjō* for the purpose of testing the proposed measure, which request was finally complied with, and the ship left the bay of Shinagawa on the 3rd of February. Subsequently, the

Director fixed the quantity of each article of food according to the Notification C. No. 7, and distributed the following Tables No. II, No. III, and No. IV to the ships, barracks, and schools.

TABLE, NO. II.  
DAILY ALLOWANCE OF FOOD FOR ONE  
HEALTHY PERSON.

(Fixed on the 2nd of Feb., 1884.)

	<i>momme</i> *	
Rice .....	180.	(Bread 160 <i>momme</i> , biscuit 130 <i>momme</i> .)
Meat.....	80.	(When eggs are substituted, each egg to be reckoned as equivalent to 10 <i>momme</i> .)
Fish .....	40.	(Where there is no fish, 20 <i>momme</i> of meat may be substituted.)
<i>Miso</i> .....	14.	
<i>Shoyu</i> .....	16.	
Vegetables .....	120.	
Beans .....	12.	
Wheat flour .....	20.	
Tea .....	2.	
Fat or oil .....	4.	
Sugar .....	20.	
Milk .....	12.	(If condensed milk, $1\frac{1}{2}$ <i>momme</i> to be given.)
Vinegar .....	2.	
Spices .....	0.3.	
Alcoholic liquors ...	24.	{ This is in the case of Japanese liquors, and when other liquors are used, the quantity shall be fixed in proportion to the amount of alcohol contained. }
Salt .....	2.	
Pickles .....	20.	
Fruit .....	(To be given with care.)	
Total .....	568.3	

If the amount of fifty one *momme* of liquid food is subtracted, there remain,

517.3,                      when rice is used.

497.3,                      when bread is used.

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\* One *momme*=58 grains Troy.

467.3, when biscuit is used.

It is not necessary to give the exact allowance every day, but if the food of two weeks is averaged, the average daily allowance should be equivalent to the daily prescribed amount.

### TABLE, NO. III.

#### A.

#### DAILY ALLOWANCE OF FOOD FOR ONE PATIENT.

(For those who can not take ordinary food.)

	<i>momme</i>	
Rice .....	90.	(Bread 80 <i>momme</i> .)
Meat.....	50.	
Vegetables .....	50.	
Soup.....	2.	
Salt .....	8.	
Vinegar .....	2.	
Black tea .....	2.	
Sugar .....	12.	
Condensed milk .....	6.	
Butter .....	8.	
Cocoa .....	4.	(Tea may be substituted.)
Alcoholic liquors.....		(Given by decision of surgeon.)

#### B.

	<i>momme</i>	
Rice .....	60.	(Bread 60 <i>momme</i> .)
Soup.....	2.	
Salt .....	8.	
Black tea.....	2.	
Sugar .....	12.	
Condensed milk .....	20.	
Butter .....	8.	
Cocoa .....	4.	(Tea may be substituted.)
Alcoholic liquors.....		(Given by decision of surgeon.)

TABLE,  
(Made on the 8th of

A		B
No. 1	No. 2	No. 1
Meat (beef or mutton) with bone...15 ozs.	Roast joint, chop or steak.	Chicken..... 8 ozs. „ with bone 10 „
Bread.....16 „	Joint (beef or mutton) with bone...10 ozs.	Bread.....16 „
Potatoes.....16 „	Chop.....10 „	Potatoes..... 8 „
Barley.....1½ „	Steak (without bone).. 8 „	Salt..... ½ „
Salt..... ¾ „	Bread.....16 „	Tea..... ¼ „
Tea..... ½ „	Potatoes..... 8 „	Sugar.....1½ „
Sugar... ..1½ „	Salt..... ¾ „	Milk..... 6 „
Milk... .. 6 „	Tea . . . . . ½ „	Butter..... 1 „
Vegetables... .. 4 „	Sugar.....1½ „	
Butter... .. 1 „	Milk ..... 6 „	
Flour..... ½ „	Vegetables..... 4 „	
	Butter..... 1 „	
	Barley.....1½ „	
BREAK		
Tea..... 1 pt.	Tea..... 1 pt.	Tea..... 1 pt.
Bread..... 6 ozs.	Bread..... 6 ozs.	Bread..... 6 ozs.
Butter..... ½ „	Butter..... ½ „	Butter..... ½ „
DIN		
Soup..... 1 pt.	Barley water...15 ozs.	Chicken.....8 ozs.
Meat.....12 ozs.	Roast joint, chop, steak, roasted or stewed.	Roasted, boiled, stewed or made into chicken broth.....12 ozs.
Bread..... 4 „	Meat..... 8 ozs.	Bread..... 4 „
Potatoes.....16 „	Bread..... 6 „	Potatoes..... 8 „
	Potatoes..... 8 „	
	Vegetables..... 4 „	
SUP		
Tea..... 1 pt.	Tea..... 1 pt.	Tea..... 1 pt.
Bread..... 6 ozs.	Bread..... 6 ozs.	Bread..... 6 ozs.
Butter..... ½ „	Butter..... ½ „	Butter..... ½ „



## NO. IV.

february, 1884.)

	C	
No. 2	No. 1	No. 2
Beef (without bone)..8 ozs.	Bread.....12 ozs.	Bread.....12 ozs.
Bread.....14 „	Rice..... 2 „	Tea..... $\frac{1}{2}$ „
Salt..... $\frac{1}{2}$ „	Milk..... 2 pts.	Sugar..... $2\frac{1}{2}$ „
Tea..... $\frac{1}{4}$ „	Sugar..... 1 oz.	Milk..... 6 „
Sugar..... $1\frac{1}{2}$ „		
Milk..... 6 „		
Butter..... 1 „		

## FAST.

Tea..... 1 pt.	Milk..... $\frac{1}{2}$ pt.	Tea..... 1 pt.
Bread..... 5 ozs.	Bread..... 4 ozs.	Bread..... 4 ozs.
Butter..... $\frac{1}{2}$ „		

## NER.

Beef tea.....15 ozs.	Rice milk..... 1 pt.	Tea..... 1 pt.
Bread..... 4 „	Bread..... 4 ozs.	Bread..... 4 ozs.
	Sugar..... 1 „	

## PER.

Tea..... 1 pt.	Milk..... $\frac{1}{2}$ pt.	Tea..... 1 pt.
Bread..... 5 ozs.	Bread..... 4 ozs.	Bread..... 4 ozs.
Butter..... $\frac{1}{2}$ „		

Note:— Drinks for patients are to be made according to the following proportions;

*Barley water*.—Barley, 2 oz. ; sugar, 2 oz. ; for every five pints.

*Gruel*.—Wheat flour, 2 oz. ; sugar,  $1\frac{1}{2}$  oz., to two pints.

*Rice water*.—Rice, 2 oz.; sugar, 2 oz. for every five pints.

*Lemonade*.—Two large lemons; and sugar,  $1\frac{1}{2}$  oz.; to two pints.

Two oz. of pepper may be issued for every 100 diets except tea and milk diet, and 1 oz. of mustard may be issued for every 20 be ef diets.

(Fixed on the 8th of February, 1884.)

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On the 28th of May, 1884, the following report was sent by Capt. Arichi respecting *Kak'ke* amongst the crew of the *Tsukuba*.

Auckland, New Zealand,

March 28th, 1884.

Leaving the bay of Shinagawa on the 3rd of last month, we reached this port on the 21st inst. During the voyage, the measures considered important were strictly carried out, and special care was taken respecting food, eighty *monme* of meat being given daily, to each man, together with a sufficient quantity of condensed milk and biscuit. The health of all the members of crew is better than when they were in Shinagawa or Yokosuka, so that the average number of cases of sickness treated every day is 2.8, and there is no case originating in bad nutrition. The cases which might be called *Kak'ke* were three amongst the cadets, and one amongst the men, but all except one cadet—an ordinary subacute case—had only a slight swelling in the legs, and although the actual condition of the persons affected did not make the administration of medicine necessary, some medicine was given as a preventive, and also to raise the spirit of the



patients. There is no other matter to be reported at present, and any further particulars will be reported after the return of the vessel. The above report has been made after consultation with the members of the committee for examination.

Shinanojō Arichi, Captain,  
Member of the committee  
for examination of *Kak'ke*.

With the above report, the following minute report came from Chūkitsu Aoki, Naval Surgeon.

Auckland, New Zealand,  
March 29th, 1884.

Leaving the bay of Shinagawa on the 3rd of last month, we reached this port on the 21st inst. The following is a brief report of the events which occurred during the voyage.

*Weather.*—Weather was unsettled during about five days from the second day after sailing, when, the waves being high, the vessel had so much motion that many of the cadets and boys who were not accustomed to the sea suffered from seasickness. We were very anxious about the wet state of the vessel, from the succession of rainy days, fearing it might cause some disease, but fortunately, we began to have fine days in succession from the seventh day, and after entering the torrid zone, we had no stormy days, there being only a shower now and then.

*Health.*—The health of all the members of the crew is far better than when they were in Shinagawa or Yokosuka. During the forty eight days of the voyage, the total number of cases of sickness was 138, which gives an average of 2.8 cases per day. But the only patients who were treated in bed were three or four persons in the beginning, who suffered from cold on account of the irregular weather, and who had some fever, in consequence of which they were confined to bed for one or two days. There was no case occasioned by deficiency of nutrition, all of the cases being either common unclassified

diseases or slight injuries.

*Special cases of disease or injury.*

*Kak'ke*.—The cases which might be called *Kak'ke* were four, of which three were amongst the cadets, and one amongst the men. In all of these cases except that of one cadet—a common subacute case—there was only some swelling and slight numbness in the legs, and medicine was not thought to be really needful. But they were recorded in the sick-list, and medicine was given, not from necessity, but merely to encourage the patients and also the men in general. Consequently, it might be said that there was only one case of *Kak'ke* during the voyage.

*Scabies*.—One case of scabies appeared on the 20th of February, and soon infected five other persons. But as these patients were treated strictly, and were ordered to be careful not to touch others, the complaint disappeared entirely on the 7th of March.

*Concussion of the brain*.—Jirō Kodama, seaman of the first class, while cleaning the deck on the 20th of March, fell down from the lower deck to the cockpit (16 feet deep), and, striking his face, he became senseless, with bleeding from the nostrils and ears. After regaining consciousness, he had a severe headache, with high temperature, and was delirious during the night. We were anxious about his prognosis, but from the next day, his headache gradually decreased, there being no other bad symptom, and to-day he is almost restored to his normal condition.

*Food*.—The food was given in accordance with the direction of the Director General, more food being sometimes given, but never less than the prescribed amount. Fresh meat was given during the first ten days, and afterwards preserved meat was given alternately.

*Body-weight*.—The body-weight of all the members of the crew, including the Captain, was taken every week, and it was found that the weight of the majority had increased

each time after the first week. The decrease of the weight of the greater number in the first week (compared with the weight taken on the 7th of July) might have been due to their not being able to take a sufficient quantity of food on account of sea-sickness, and also to their having injured their digestive organs during the period from the holidays of January to the time of sailing.

The foregoing is a brief account of the events which I have to report up to the present. We expect to stay in this port about three and a half weeks, during which time a daily allowance of 100 *momme* of meat and 2 lbs. of bread will be given to each of the men, and they will be allowed free exercise on shore in order that they may fully regain strength during our stay here. We further expect to lay in a stock of meat and vegetables to be used after we have left this port.

Chūkitsu Aoki, Naval Surgeon.

In July of the same year, the cases of *Kak'ke* in ships, barracks, and schools were examined, when it was found that the number of new cases during the period from January to June was 145, which was only little more than one fourths of the number (525) of new cases during the period from January to June of the previous year. The results of this examination, together with the facts of the following report, which is the 2nd report received from the *Tsukuba* while on a voyage undertaken for the purposes already named, show that *Kak'ke* can be prevented by the improvement in the scale of diet as it was expected.

Coquimbo, Chile, South America,  
July 3rd, 1884.

We left Auckland on the 17th of April, and, after calling at the island of Kawau (situated at the mouth of Hauraki bay,

twenty eight nautical miles from Auckland), we reached the port of Valparaiso, Chile, in the afternoon of the 22nd of June. On the 27th, we left Valparaiso, and arrived at this port yesterday. The following is a report of what occurred from the time when the last report was made till our arrival at this port.

*During the stay at Auckland.*—As was stated previously, a sufficient allowance of meat and vegetables was given to the crew, and free exercise on shore was allowed. The general health in consequence was good, the average number of cases of sickness being 2.2 in a day, all of them being mild cases of unclassified diseases, without any special case to be reported.

*Kak'ke.*—A boy had numbness in the leg and cramp in the calf, from the 29th of March, but without any other symptom; he worked as usual and was perfectly recovered by the 21st of April. This was diagnosed as a mild case of *Kak'ke*.

*Body-weight.*—Arriving at Auckland on the 21st of March, the body-weight of the whole crew was taken on the 24th of March and again on the 14th of April, and the result obtained is shown in the following table.

	Increase.	Decrease.	No change.
Officers.....	22	11	2
Cadets.....	7	18	..
Petty officers & men..	183	78	12
Total .....	212	107	14

It is seen from the above table that there was an increase of body-weight as regards the greater number of those on board, the cadets excepted.

Looking at the whole, two-thirds of all on board increased in body-weight, a fact which shows a satisfactory result.

*The voyage from New Zealand to Chile.*—We left Auckland on the 17th of April, and stopped at the island of Kawau, at the mouth of Hauraki bay, twenty eight nautical



miles from Auckland, for the purpose of practising with the guns. On the 20th, we left that island, and reached Valparaiso, Chile, on the 22nd of June. At Auckland, due preparations were made, for the voyage. As we were to sail somewhere about 40° S. L., and the wind was expected to be favourable, we hoped to reach our destination in about fifty days, and, the climate being cool, we provided fresh meat for two weeks and vegetables for fifty days. But, after three days, some of the meat began to putrefy, in consequence of which we were without fresh meat for about a week. In Auckland there are so many flies wherever one goes, that the meat exposed for sale seems to be covered with them. As the flies accompany the meat when it is taken on board ship, the meat soon putrefies, unless protected by a suitable covering. We were quite ignorant on this point, and, in consequence, lost valuable food ; in the vegetables, however, there was no change. Tinned meat, fruit, and vegetables, together with condensed milk and sugar, were provided for one hundred days.

*Weather.*—This voyage took sixty seven days, which was longer by about fifteen days than the estimated period. The weather was unsettled, the waves high, and the ship was much tossed about. Contrary winds often brought rain, and there were not two bright days in succession. Even when there was no rain, the air was always damp, and the weather was often stormy, there being seven or eight strong gales lasting twenty four hours. The temperature of the atmosphere was between 50° and 60° Fahr.

*Food.*—Food was given in the same way as stated in the last report, the only difference being that the food did not consist of home provisions, but of provisions bought at Auckland.

*General health.*—The weather was bad, as already stated, and this was not only unfavourable in its general effects, but it entailed more or less hard work upon the men. The general health, however, was even better than in the last

voyage, so that the total number of cases of sickness during sixty seven days was 107, which gives an average of 1.5 per day. All of these were cases of ordinary complaints, most of them being cases of obstinate tonsillitis and pharyngeal catarrh, on account of the bad weather. Those complaints which drew special attention were the following two.

*Kak'ke*.—There were six cases in all—one cadet and five seamen. All were subacute cases, of which, four were cured before arrival in port, and the other two some days afterwards.

*Typhoid fever*. (?)—During the stay at Auckland, it was said that there were some cases of typhoid fever in the neighboring villages, and some also under treatment in the hospital. On the 27th of April, that is eleven days after we had left Auckland, one seaman began to have a febrile disease, the principal symptoms of which were high temperature (when highest 103.2° Fahr.), tenderness of right iliac fossa, and bloody flux. The high temperature continued for five days only, and the man had completely recovered by the 13th of May. Fortunately, there was no other case of a similar nature, and it was decided that this case might be one abortive typhus.

*Body-weight*.—During the last voyage, the body-weight was taken every week to compare the state of nutrition of the body, but it could be taken only four times during this voyage, on account of the tossing of the vessel, and the body-weight was found to have increased generally each time, in spite of the long stormy voyage of sixty seven days. This fact shows that the food was good and suitable. The following table shows the body-weight taken one day after our arrival at Valparaiso, compared with that taken on the 14th of April, or two days before we left Auckland.

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Note ;—The body-weight of twelve out of thirty five officers was not taken, on account of their being on duty. The deficiency of one amongst the whole number (273) of petty officers and men, was due to the accident detailed in the paragraph under *Drowning*.

	Increase.	Decrease.	No change.
Officers.....	20	3	..
Cadets .....	23	..	2
Petty officers & men. .	175	87	10
Total .....	218	90	12

*Drowning.*—On the 13th of June, at 5, 40, A. M. while he was hoisting a sail, Hebe Nagai, seaman of the first class, accidentally fell into the sea, when he was climbing up the rigging of the fore-mast. A life-buoy was immediately thrown out, to which followed the life-boat, but the life-buoy could not be lighted as it was wet from continuons rain. As there were signs of an approaching typhoon, the life-boat was taken up without having had time to make a sufficient search. Consequently, we are sorry to say the man's body could not be found. His number in the sick-list is 1,745.

*Valparaiso.*—As this port was not safe to make a long stay in, we left it on the 27th of June, having purchased and taken on board the necessary provisions. We stayed four days in Valparaiso, during which time nothing occurred to be reported upon.

*Coquimbo.*—We reached this port in the afternoon of the 2nd of July. There was nothing to be reported on during the voyage from Valparaiso to this port.

We are expecting to stay about three weeks here in this port. We have stated to the Captain that every thing shall be carried out here as during the stay at Auckland, the body-weight will be taken, and a sufficient rest will be allowed to the men before the ship sails again.

## Health Report of the *Tsukuba* for 1884.

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The health report of the *Tsukuba* for 1884 will be given under two heads, the one relating to her stay in home waters, the other to her voyage abroad. Under the former head, occurrences during her stay at various home ports will be mentioned, and under the latter head occurrences during the voyage or during her stay at various foreign ports.

### *Stay at homeports.*

When the repairs were finished in November last, this ship was sent to Shinagawa Bay, where she remained till the 2nd of February.

Preparations for the foreign voyage necessitated a demand for an extra supply of medicines and medical appliances, for use in the course of the voyage. The only difference in the articles and amount between this and former occasions lay in the demand for a larger amount of stomachics. This is because I noticed, after joining this ship, that the expense of those medicines was always greater than that of the others. Provisions had also to be bought and placed on board, with a view to carrying out the regulations made by the Director of the Medical Bureau.

A medical examination of the crew was made to determine who were fit for a long voyage. This examination was carried out on the 7th of January under the direction of Fleet Surgeon Shimada, the Chief Surgeon of the Port Admiralty. Excluding the officers from the whole number of 328, 25 cadets and 243 petty officers and men were examined, when it was found that 39 persons were medically disqualified. The following table shows the cause of their rejection, distinguishing according to the classification of force, viz., cadets, petty officers, etc.



CAUSE OF REJECTION.	CADETS.	PETTY OFFICERS.	SEAMEN.	<i>Jūnsotsu.</i> *
Convalescence.....	1	....	....	....
Pleurisy .....	1	....	....	....
(Edema of the penis.....	....	1	....	....
Ulcer of the cornea.....	....	1	....	....
Internal & external hemorrhoids...	....	....	1	....
Acute gonorrhœa.....	....	....	2	....
Chronic bronchial catarrh.....	....	....	2	....
Debility after <i>Kak'ke</i> .....	....	....	2	....
Chronic gonorrhœa .....	....	....	1	....
Subacute „ .....	....	....	1	....
Hydrocele & orchitis.....	....	1	....	....
Debility.....	....	....	1	....
<i>Kak'ke</i> .....	....	....	7	....
External hemorrhoids.....	....	....	....	1
Heart disease.....	....	....	....	1
Rupture of the upper limbs.....	....	....	1	....
Weakness of respiratory sound of right lung .....	....	....	2	....
Inguinal hernia.....	....	....	2	....
Fistula in ano.....	....	....	1	....
Neuralgia.....	....	....	1	....
Chronic pleurisy.....	....	....	1	....
Gonorrhœa and external hemor- rhoids.....	....	....	1	....
Enlargement of the testicle.....	....	....	3	....
Internal blind hemorrhoids.....	....	....	1	....
Syphilis.....	....	....	1	....
Orchitis.....	....	....	1	....
	2	3	32	2
Total.....	39			

Note:—The seven cases of *Kak'ke* in this table are not cases which are under actual treatment, but either old cases suspected of readiness to break out again, or cases found to have some signs of *Kak'ke* at the time of examination.

\* Men who are employed to serve various capacities, but who are treated as ordinary seamen, stokers etc. according to the character of the service.

Having completed a long voyage, we returned to the bay of Shinagawa on the 16th of November at 10, 10, A. M., where we stayed until the 28th of December, when we left the bay at 10, 50, A. M., and entered the port of Yokosuka at 2, P. M., where we stayed until the 31st. Three patients suffering respectively from phthisis, ulcer of the cornea and hæmaturia, were sent to the Tōkyō Naval Hospital. The commanding officer of the Port Admiralty came on the 24th of November, and Chief Surgeon, Shimada examined the medical instruments and account books, and then inquired into the health of the crew during the voyage. Holidays were given to the crew from the 28th of November, and the drilling was entirely stopped.

### *The Voyage.*

We left the bay of Shinagawa for Auckland, New Zealand, on the 3rd of February, at 8, 20, A. M., the whole company being 333, composed as following.

Captain.....	1
Commander .....	1
Lieutenants, sub-lieutenants and other officers, including two surgeons }	33
Cadets.....	25
Petty officers, including one sick-berth attendant.....	48
Men, including one sick-berth attendant and fifteen stokers.....	188
<i>Jūnsotsu</i> .....	37

The food of cadets, petty officers and men during the voyage was, as shown in the following table, according to the directions of the Director of the Medical Bureau, instructions being given that the allowance of food should exceed rather than fall short of the prescribed amount.

Table showing the daily amount  
of diet for one person.

<i>Momme.</i>	<i>Momme.</i>	<i>Momme.</i>
Rice.....180	Fish.....40	Meat..... 80
Fat ..... 4	Sugar.....20	Milk..... 12
<i>Miso</i> ..... 14	<i>Shoyu</i> (sauce).....16	Vegetables.....120
Vinegar... 2	Beans.....12	Wheat flour..... 20
Spices .... 0.3	Tea..... 2	Salt ..... 2
Pickles..... 20	Alcoholic liquors (Japanese)50	Fruit (a suitable quantity)

In the closets in the various parts of the ship, small boxes of chloride of lime were placed, which were to be changed every other day. On the lower deck, and in the cockpit fore and aft, carbolic acid solution (2 %) was sprinkled every morning after cleaning, and also in the afternoon, when these places were examined.

Before dealing with the general sanitary matters of the voyage, the following table will be given to show the dates of sailing and arrival, as well as the duration of voyage and length of stay in harbour.

Port of sailing.	Date of sailing.	Port of arrival.	Date of arrival.	Duration of voyage.	Duration of stay in port.
Shinagawa	Feb. 3rd.	Auckland	Mar. 21st.	48 days.	29 days.
Auckland	Apr. 20th.	Valparaiso	Jun. 22nd.	65 „	4 „
Valparaiso	Jun. 27th.	Coquimbo	Jul. 2nd.	6 „	27 „
Coquimbo	Jul. 30th.	Hono'ulu	Sept. 19th.	52 „	19 „
Honolulu	Oct. 9th.	Shinagawa	Nov. 16th.	37 „	
Total ....				208 days.	79 days.

*Voyage from Shinagawa to Auckland.*—This voyage took 48 days, during which the new cases of sickness occurring were 6 amongst the officers, 7 amongst the cadets, and 120 amongst the petty officers and men. The complaints specially to be noticed were 2, viz, *Kak'ke* and scabies. Three cadets were attacked by *Kak'ke* and two of the men, all of them very mild cases. One case of scabies appeared on the 21st of February, and five other cases followed, but this complaint had entirely disappeared by the 7th of March.

*Stay in the port of Auckland.*—During the stay of 29 days, 66 cases of sickness appeared amongst the petty officers and men, of which there was one case of *Kak'ke*, while the rest were common cases of unclassified diseases.

*Voyage from Auckland to Valparaiso.*—Sixty five days were spent in this voyage, during which the weather was mostly stormy, and the men were consequently obliged to work hard. The interior of the ship was wet all the time, and could not be made dry, but as the climate was, fortunately, favourable to the health of the men, they were able to take a sufficient quantity of food. The body-weight consequently increased, and the number of cases of sickness decreased considerably, the new cases being two of officers, four of cadets and ninety two of the petty officers and men; of these, six were cases of *Kak'ke*—one of a cadet and five of petty officers and men.

*Stay in the port of Valparaiso.*—We stayed four days in this port, during which time there were three cases of unclassified diseases.

*Voyage from Valparaiso to Coquimbo.*—During this voyage of six days, there were ten new cases of sickness, but there was no case of importance.

*Stay in the port of Coquimbo.*—During our stay of 27 days, the cases of sickness were 1 case of an officer, and 61 cases of petty officers and men, amongst which were, *Kak'ke* 1, acute rheumatism 2, mild chancre 1, and gonorrhœa 3. This

port is enveloped in a dense fog, from the evening till 8 or 9 o'clock next morning, and the temperature is very irregular, which fact was thought to have been the cause of many cases of rheumatism. There are also numerous secret prostitutes here, and the cases of gonorrhœa had their origin at this port, while the case of chancre had its origin at Valparaiso.

*Voyage from Coquimbo to Honolulu.*—This voyage took 52 days, during which time the weather was favourable and pleasant, but our bodies felt relaxed and we had night sweats. Our appetite was therefore not active, and, in consequence, the body-weight was found to have decreased in most of the company, in spite of the more favourable weather and less labour than on the voyage from Auckland to Valparaiso. There were also many cases of cold and pharyngeal catarrh. The cases of sickness were 2 of cadets and 54 of petty officers and men, amongst which there was 1 case of *Kak'ke*.

*Stay in the port of Honolulu.*—During the 19 days of our stay, there were 31 new cases of sickness amongst petty officers and men, of which 2 were *Kak'ke* while all the rest were mild cases of unclassified diseases.

*Voyage from Honolulu to Shinagawa.*—This voyage took 37 days, during which the new cases that appeared were 3 amongst the officers, 1 amongst the cadets, and 41 amongst the petty officers and men. There was no case of *Kak'ke* during this voyage, but one of the officers died from typhoid fever.

*Summary.*—The total number of days spent on the whole voyage was 287, and the number of cases of sickness was 12 of officers, 15 of cadets, and 478 of petty officers and men. The ratio of the extended number of cases per 100 of the extended number of men was 5.97, the ratio of the cases under light work was 0.65 and the number under rest was 1.31.

The points for special notice are the smaller number of the



cases of *Kak'ke* and gastric diseases, and the larger number of cases of cold and pharyngeal catarrh. The decreased number of the former cases is supposed to have been due to the good quality of the food, which was appropriate to the degree of labour exacted, while the larger number of the latter is supposed to be due to the greater number of days spent in the region of hot climates during the voyage, and to the bad quality of the clothing.

The examination of the body-weight carried out during the voyage is of much importance, and it is given in the Table No. 27, which shows the increase or decrease on each occasion. (Table No. 27 is omitted here.)

Chūkitsu Aoki,  
Staff-Surgeon, H. I. J. M. S.  
*Tsukuba.*

Note:—It is stated in the report that there were 4 cases of *Kak'ke* amongst the cadets, but there were in reality but 2 patients, each of whom was attacked twice. The number of persons amongst the petty officers and men attacked by *Kak'ke* was 12. The ratio of the cases of *Kak'ke* amongst cadets was 1 in 6.25 persons (as regards the actual number of persons attacked, it was 1 in 12.5). The ratio of the cases of *Kak'ke* amongst the petty officers and men was 1 in 24.91 persons. There was no case amongst the officers.

TABLE, NO. V.

COMPARATIVE TABLE SHOWING THE DURATION OF VOYAGE AND OF STAY IN PORT, STATE OF WEATHER, AMOUNT OF FOOD, AND NUMBER OF CASES OF KAK'KE DURING THE VOYAGES MADE BY THE *RYUJŌ* & *TSUKUBA* TO SOUTH AMERICA.

PERIOD.		DATE.	VOYAGE.	DURATION OF VOYAGE OR STAY.		TEMPERATURE. (FAHR.)	BAROMETER	WEATHER.	DAILY AMOUNT OF FOOD TAKEN BY ONE PERSON.		CASES OF <i>Kak'ke</i> .
Voyage of <i>Ryugo</i> (1882-1883).	1st PERIOD.	Dec. 19, 1882 to Jan. 31, 1883.	Shinagawa to Wellington.	Voyage. 44 days Stay. ..	66-87	29.75-30.19	Clear. 16 days Fair. 17 " Cloudy. 8 " Rain. 3 "	Animal. 25.57 Vegetable. 351.97	3		
	2nd PERIOD.	Feb. 1, 1883 to Mar. 31.	Wellington to Valparaiso.	Voyage. 44 Stay. 15	67.5-74	29.98-33.26	Clear. 11 " Fair. 25 " Cloudy. 15 " Rain. 8 "	Animal. 37.63 Vegetable. 276.70	7		
	3rd PERIOD.	Apr. 1 to May 31.	Voyage continued; stay at Valparaiso; to Callao stay at Callao; to Honolulu.	Voyage. 39 Stay. 22	67.5-79.7	27.62-30.16	Clear. 29 " Fair. 16 " Cloudy. 13 " Rain. 3 "	Animal. 33.07 Vegetable. 290.89	25		
	4th PERIOD.	Jun. 1 to Jul. 31.	Voyage continued; stay at Honolulu.	Voyage. 32 Stay. 29	81.5-83.8	29.99-30.18	Clear. 47 " Fair. 13 " Cloudy. 6 " Rain. ..	Animal. 61.68 Vegetable. 279.99	125		
	5th PERIOD.	Aug. 1 to Sept. 15.	Stay at Honolulu; to Shinagawa.	Voyage. 42 Stay. 4	81.8-86.0	26.30-33.56	Clear. 1 " Fair. 34 " Cloudy. 5 " Rain. 1 "	Animal. 69.95 Vegetable. 223.28	..		
	TOTAL		271 days.		Voyage. 201 Stay. 70	Max. 87 Min. 66	Max. 33.56 Min. 26.30	Clear. 104 " Fair. 105 " Cloudy. 47 " Rain. 15 "	Animal. 12,623.18 Vegetable. 77,118.47	160	
Voyage of <i>Tsukuba</i> (1884).	1st PERIOD.	Feb. 3, 1884 to Mar. 31.	Shinagawa to Auckland; stay at Auckland.	Voyage. 48 Stay. 9	63-98	30.98-30.13	Clear. 24 " Fair. 16 " Cloudy. 10 " Rain. 7 "	Animal. 125.59 Vegetable. 363.12	5		
	2nd PERIOD.	Apr. 1 to May 31.	Stay at Auckland; to Valparaiso.	Voyage. 41 Stay. 20	69-74	29.89-29.98	Clear. 29 " Fair. 20 " Cloudy. 10 " Rain. 2 "	Animal. 125.91 Vegetable. 351.43	7		
	3rd PERIOD.	Jun. 1 to Sept. 31.	Voyage continued; stay at Valparaiso; to Coquimbo; stay at Coquimbo; to Honolulu.	Voyage. 30 Stay. 31	68-70	27.71-30.86	Clear. 31 " Fair. 13 " Cloudy. 12 " Rain. 5 "	Animal. 114.66 Vegetable. 342.62	1		
	4th PERIOD.	Aug. 1 to Sept. 30.	Voyage continued; stay at Honolulu.	Voyage. 50 Stay. 11	74-83	27.99-32.97	Clear. 30 " Fair. 15 " Cloudy. 13 " Rain. 3 "	Animal. 114.87 Vegetable. 308.83	3		
	5th PERIOD.	Oct. 1 to Nov. 16.	Stay at Honolulu; to Shinagawa.	Voyage. 39 Stay. 8	75-84	33.37-29.68	Clear. 17 " Fair. 12 " Cloudy. 16 " Rain. 2 "	Animal. 126.88 Vegetable. 324.38	..		
	TOTAL		287 days.		Voyage. 208 Stay. 78	Max. 98 Min. 63	Max. 33.37 Min. 27.71	Clear. 131 " Fair. 76 " Cloudy. 61 " Rain. 19 "	Animal. 34,893.46 Vegetable. 97,017.48	16	





In accordance with the memorial presented on the 13th of February, 1885, by Deputy Inspector-general Kanehiro Takaki, the Director of the Medical Bureau, the following Order was given to the Navy in general.

C. No. 10.

It is hereby ordered that the words "and barley" shall be added after the word "rice" amongst the articles of food of Art. II of the Regulations in regard to the Supply of Food to Petty Officers and Men in Ships and Barracks, which were issued in January, 1884, with C. No. 7.

It is hereby ordered that, as barley was added amongst the articles of food of Art. II of the Regulations in regard to the Supply of Food to Petty Officers and Men in Ships and Barracks by the Order C. No. 10, a mixture of rice and cracked barley in equal proportion shall be given once a day, at breakfast, from the 1st day of March to the 15th; twice a day, at breakfast and dinner, from the 16th to the 31st; and at three meals from the 1st of April until further notice.

Count Sumiyoshi Kawamura,

Minister of the Navy Department.

February 21st, 1885.

To Vice-admiral Viscount Nakamuta,

Commanding Officer of the Port Admiralty at Yokosuka.

Rear-admiral Matsumura,

Commanding Officer of the Fleet.

ADDRESS DELIVERED BY DEPUTY INSPECTOR-GENERAL  
TAKAKI, THE DIRECTOR OF THE MEDICAL BUREAU  
AT SUIKŌSHA ON THE 25TH OF FEBRUARY,  
1885.

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All of the gentlemen here present will remember the Orders G. No. 2,743 (2), issued on the 29th of November, 1883, and C. No. 7, issued in January, 1884, by which regulations regarding food were made for the first time. By last year's experience, we have found that most of the men dislike meat as well as bread, and we do not know what we shall do next. But if we leave the matter to their wish, we shall certainly have a great many cases of *Kak'ke*, as has hitherto been the case, especially as more than 1,000 new men have been enlisted this year. Now, there is nothing better than barley food for preventing *Kak'ke*. As, however, barley is coarse in appearance, we are afraid that some of the men who do not understand the object of the improvement in the scale of diet will feel dissatisfied. We consequently wish to speak about the preventive measures to be adopted against *Kak'ke* and to take this opportunity of reporting the result of the examination into *Kak'ke* on board the *Ryūjō*.

That *Kak'ke* can be prevented by an improvement in the scale of diet has been deduced from scientific reasoning, and has been proved by experience in our Navy, and for a long time we were planning such preventive measures. Fortunately, G. No. 2,743 (2) was issued on the 29th of November, 1883, directing that nutritious food should be given as far as possible, to which followed the Regulations in regard to the Supply of Food, which were issued with C. No. 7, in January, 1884. According to those regulations, the Medical Bureau drew up tables showing the proper amount of food for healthy men and invalids, and distributed these to vessels, barracks,

and hospitals, thus trying to ensure the health of the men. As, however, we had expected, these suggestions often could not be carried out, especially in the case of newly enlisted men, who not only dislike bread, but can not take a proper amount of meat. If things are left in such a condition, there is no doubt, from recent experience, that we shall again have a great many cases of *Kak'ke* this year, in spite of the favourable result shown in the decrease of cases of *kak'ke* which was obtained in the year which followed the improvement in the scale of diet. This is why we decided to give the barley food. We believe that the majority of the men in our Navy have been used to take barley food from their child-food, so that in reality they can eat it, although they show their dissatisfaction at it after becoming accustomed to the rice given to them since they entered the Navy. It is accordingly considered that the best preventive measure, at present, against *kak'ke*, will be to give barley, which it was directed should be given to the Navy in general from the month of March by the Order of the 21st inst. If this Order is carried out strictly, we are sure to find no case of *kak'ke* in our Navy. We consequently ask gentlemen, that you will kindly help us in the work of prevention, for the good of our country, according to the Order just given.....  
 .....

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In the year 1886, the health of the Navy improved continuously, and cases of *kak'ke* had almost disappeared, when the following Order was issued, on the 13th of July, to the Navy in general.

Navy Order, No. 63.

It is herewith ordered that Order, C. No. 64, July 1880, in regard to Boarding Allowances, as well as the Order, C. No. 7, January, 1884, being the Regulations in regard to the

Supply of Food to Petty Officers and Men of the Navy in Ships and Barracks, shall cease to take effect, and the following Regulations for giving Boarding Allowances to Men of the Navy in Ships and Barracks shall be observed.

Count Yorimichi Saigo,

Minister of the Navy Department.

July 13th, 1886.

TABLE SHOWING THE DAILY ALLOWANCE ON ACCOUNT  
OF FOOD OF MEN  
OF THE NAVY IN SHIPS AND BARRACKS.

SHIPS AT SEA.			Ships permanently at anchor, and barracks.
WITHIN E. lon. 110 & 160 N. lat. 20 & 50	BEYOND E. lon. 110 & 160 N. lat. 20 & 50	For night food during voyage.	
<i>yen</i> 0.18	<i>yen</i> 0.24	One third of daily payment in each case.	<i>yen</i> 0.15

The boarding allowance shall be given from the day when men go on board ship, or enter a barrack, until the day before they leave the ship or barrack. But to men who cease duty or leave the service or who die, the same shall be given until the day when they leave the ship or barrack, or till the day of death.

Petty officers and men engaged in other shore stations shall have the same boarding allowance as men in barracks.

The boarding allowances shall not be given to men who are absent from ships or barracks on account of injury or sickness, or on account of any private matter, except during the holidays, or to men who are receiving the daily payment or actual food while travelling. But the daily payment for the day when they leave the ship or barrack, or when they return to the same, shall be given.

The boarding allowances for vessels which sail beyond E. Lon. 110 and 160, and N. Lat. 20 and 50, shall be given from the day when the vessels sail from any port of the country according to orders until the day when they return to the same port and cast anchors.

The allowance for night food during a voyage shall be given for service of more than one hour during the night, but shall not be given for service of less than one hour. Sunrise and sunset shall be regarded as marking the division of day and night.

In ships and barraeks, the following articles of food shall be purchased with the sum allowed for boarding expenses, and given to the men.

Rice and barley. Bread. Biscuit. Beef (fresh or tinned) Salted beef. Salted pork. Fowls and eggs. Fish. *Miso*. *Shōyu*. Beans. Vegetables (potatoes, cabbages, carrots, radishes, onions, etc.) Fats (lard or suet, butter, olive oil, oil of sesamum orientalis, etc.) Tea. Sugar and starch-containing food. Wheat flour. Milk. Vinegar. Spices. Alcoholic liquors. Salt. Pickles.

The articles of food shall be bought by the paymasters and examined by the surgeons, and then shall be given to the men. This shall not apply in the case of reserve ships.

To those who receive the boarding allowances given in the table, the allowance for night food shall not be given, even in the case of men on watch. But to those who do extra duty during the night in extraordinary cases, one-third of the daily payment shall be allowed, and the reason thereof shall be reported.

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The *Tsukuba*, which left the bay of Shinagawa for Australia on the 9th of February, 1886, returned on the 13th of November by way of Hawaii, having had no case of *kak'ke*, although her route was the same as that which she and the *Ryūjō* had once taken, when they had a great many cases of *kak'ke*. This good result was due to the fact that, in addition to the proper supply of food carried by her, she was able to get good fresh bread and meat at the various ports where she stayed for a period of some length.

Since the year 1887, *kak'ke* has become almost extinct amongst the men of the Navy. In addition, the general health has gradually improved, year by year, since 1884, as shown in the table at the end of this book. The *Ryūjō*, which sailed on the 1st of February, 1887, and returned on the 11th of September, had no case of *kak'ke* on board, notwithstanding that she followed the same course as on a former occasion, when there was a large number of cases of *kak'ke*. It was the same with the *Tsukuba*, which sailed on the 4th of September, 1887, and returned on the 6th of July, 1888, although she followed the same course between Shinagawa and San Francisco, as on a former occasion, when there was much trouble from *kak'ke*, and although she visited Mexico, Central America, the Society Islands, and Honolulu, thus being in the tropics for a considerable length of time. All of the foregoing good results were entirely due to the improvement in the scale of diet which has been taking effect since 1884.

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TABLE No. VI.

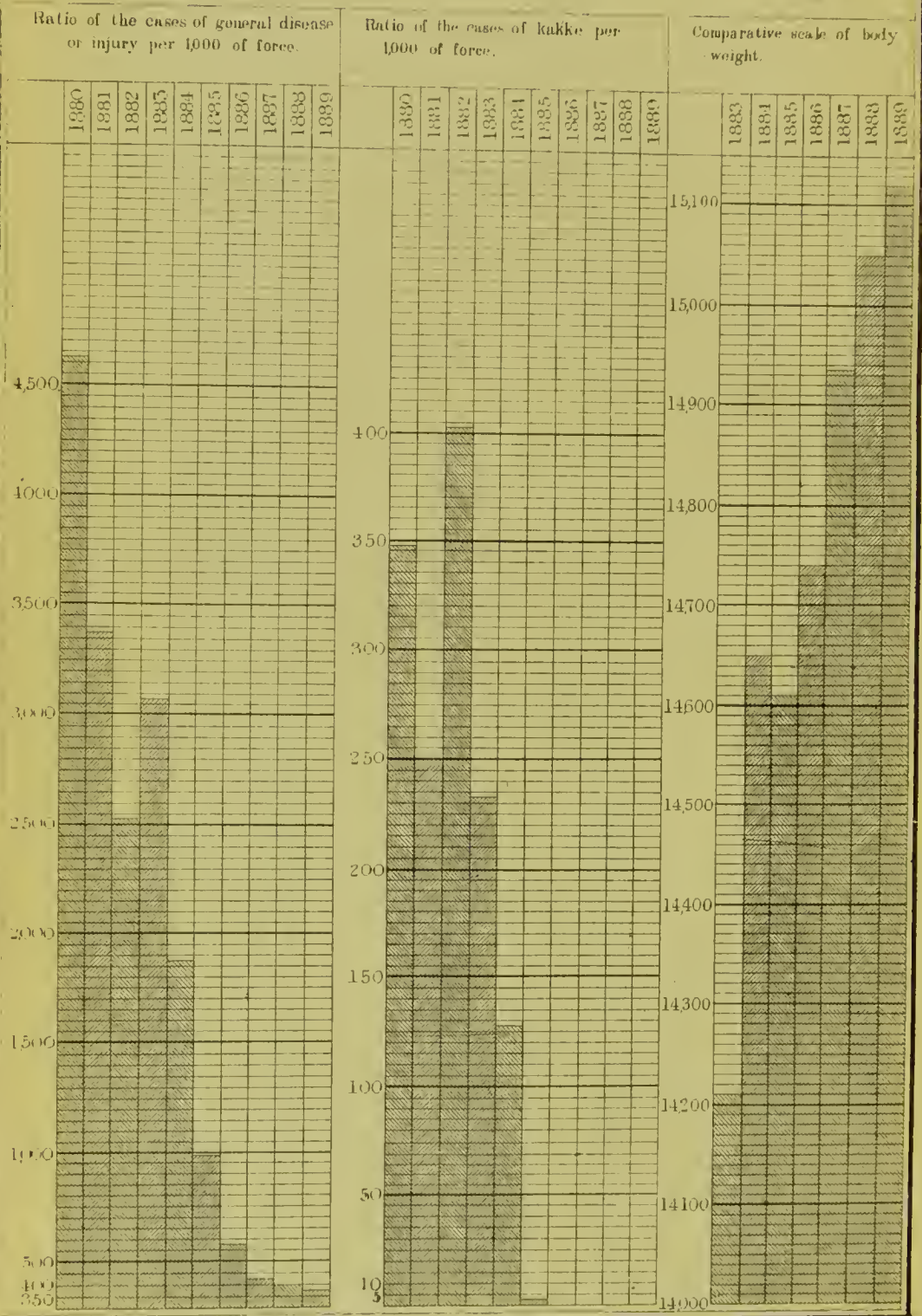
TABLE SHOWING THE GENERAL  
HEALTH OF THE NAVY.

Comparative number of the cases of general disease or injury during several years.	YEAR.	FORCE.	CASES OF GENERAL DISEASE OR INJURY.	RATIO OF CASES PER 1,000 OF FORCE.	AVERAGE RATIO OF CASES OF ONE PERSON PER ANNUM.	DIED.	RATIO OF DEATHS PER 1,000 OF FORCE.	INVALIDED.	RATIO OF INVALIDED PER 1,000 OF FORCE.
	1878	4,528	17,788	3,928.45	3.93	56	12.37	44	9.72
	1879	5,081	22,426	4,413.70	4.41	119	23.42	39	7.68
	1880	4,956	22,819	4,604.32	4.60	63	12.71	43	8.68
	1881	4,641	15,766	3,397.12	3.40	81	17.45	29	6.25
	1882	4,769	12,074	2,531.77	2.53	103	21.60	30	6.29
	1883	5,346	16,380	3,063.97	2.90	85	15.90	28	5.24
	1884	5,638	10,515	1,865.02	1.81	45	7.98	44	7.80
	1885	6,918	6,866	992.48	0.91	49	7.08	33	4.77
	1886	8,475	4,894	577.46	0.52	63	7.43	52	6.14
1887	9,106	3,954	434.22	0.40	55	6.04	56	6.15	
1888	9,184	3,679	400.59	0.40	65	7.08	84	9.15	
1889	8,954	3,480	388.65	0.39	52	5.81	49	5.47	

Comparative number of the cases of <i>kak'ke</i> during several years.	YEAR.	FORCE.	CASES OF <i>kak'ke</i> .	RATIO OF CASES OF <i>kak'ke</i> PER 1,000 OF FORCE.	DIED.	RATIO OF DEATHS PER 1,000 OF FORCE.	IN-VALIDED.	RATIO OF INVALIDED PER 1,000 OF FORCE.
	1878	4,528	1,485	327.96	32	7.07	19	4.20
	1879	5,081	1,978	389.29	57	11.22	8	1.57
	1880	4,956	1,725	348.06	27	5.45	9	1.82
	1881	4,641	1,163	250.59	30	6.46	16	3.45
	1882	4,769	1,929	404.49	51	10.69	17	3.56
	1883	5,346	1,236	231.20	49	9.17	4	0.75
	1884	5,638	718	127.35	8	1.42	1	0.18
	1885	6,918	41	5.93	...	...	1	0.14
	1886	8,475	3	0.35	...	...	...	...
1887	9,106	...	...	...	...	...	...	
1888	9,184	...	...	...	...	...	...	
1889	8,954	3	0.34	1	0.11	...	...	

Diseases decreased in company with <i>kak'ke</i> .	YEAR.	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889
	DISEASE.										
	<i>Kak'ke</i> .....	1,725	1,163	1,929	1,236	718	41	3	...	...	3
	Diseases of digestive system.....	6,399	4,192	3,043	4,230	2,519	856	472	199	202	162
	Diseases of respiratory system.....	4,890	3,476	2,400	3,136	2,164	1,249	615	415	287	250

TABLE NO. VI. (Continued.)

TABLE SHOWING THE GENERAL HEALTH OF THE NAVY.  
(Continued.)

Note.—Want of the lines showing the ratio of the cases of disease or injury before 1880 is due to the incompleteness of the statistical examinations before that year and want of the lines showing the comparative scale of body weight before 1883 is due to the fact that the examination of body weight has been commenced only from that year. In the lines showing the body weight denotes *Kakke* which is equal to 10 lbs Troy.

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